CLAIMS

What is claimed is:

1. A method of regulating a high pressure of a transcritical vapor compression system comprising the steps of:

(a) operating the system based on a model; and

(b) adapting said model to obtain a desired high pressure of the transcritical vapor compression system.

2. The method as recited in claim 1 further including the steps of:

(c) compressing a refrigerant to said high pressure;

(d) cooling said refrigerant;

(e) expanding said refrigerant; and

(f) evaporating said refrigerant.

3. The method as recited in claim 2 further including the steps of:

(g) controlling a flow of said refrigerant through the step of cooling; and

(h) adjusting the step of controlling said flow to obtain said desired high pressure.

4. The method as recited in claim 2 wherein said refrigerant is carbon dioxide.

5. The method as recited in claim 1 wherein said desired high pressure obtains a maximum coefficient of performance.

6. The method as recited in claim 1 further including the steps of:

(c) exciting the system with an excitation signal to generate a system output; and

(d) comparing said system output to a model output of said model.

7. The method as recited in claim 6 wherein an adaptive control algorithm having variable coefficients operates said model, and the step of adapting said model includes

modifying said variable coefficients such that said model output of said model substantially equals said system output of the system.

8. The method as recited in claim 7 wherein the step of comparing the system output to said model output determines a system identification error.

9. The method as recited in claim 8 wherein the step of adapting said model includes employing said system identification error.

10. The method as recited in claim 1 wherein the step of adapting the model further includes the steps of:

1) sinusoidally exciting the system to generate a response;

2) filtering said response to generate a harmonic response;

3) multiplying said harmonic response by said excitation signal to demodulate said harmonic response to a demodulated harmonic response;

4) filtering an oscillation factor from said demodulated harmonic response to separate a static gain; and

5) utilizing said static gain as a new excitation signal.

11. The method as recited in claim 1 wherein the step of adapting the model further includes the steps of:

1) establishing a left input point, a right input point, and a middle input point therebetween;

2) determining a coefficient of performance for said left input point, said right input point, and said middle input point;

3) determining a left middle coefficient of performance of a left middle input point between said left input point and said middle input point and determining a right middle coefficient of performance of a right middle input point between said right input point and said middle input point;

4) comparing said left coefficient of performance and said right coefficient;

5) determining which of said left coefficient of performance and said right coefficient of performance is a greater value;

6) utilizing said greater value as a new middle input point; and

7) repeating step 1) to step 5) employing said new middle input point as said middle input point.